इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 14966 (2001): Optics and Optical Instruments Environmental Test Methods - Combined Bounce or Steady-State Acceleration and Dry Heat or Cold [PGD 22: Educational Instruments and Equipment]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS 14966 : 2001
ISO 9022-16 : 1998

भारतीय मानक

प्रकाशिकी और प्रकाशिक उपकरण — पर्यावरणीय परीक्षण पद्धतियाँ — संयुक्त प्रस्कन्द या अपरिवर्तित अवस्था और शुष्क ऊष्मा या अतप्त

Indian Standard

OPTICS AND OPTICAL INSTRUMENTS — ENVIRONMENTAL TEST METHODS — COMBINED BOUNCE OR STEADY-STATE ACCELERATION AND DRY HEAT OR COLD

ICS 37.020

© BIS 2001

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 2001

Price Group 3

Optical and Mathematical Instruments Sectional Committee, ME 31

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 9022-16:1998 'Optics and optical instruments — Environmental test methods — Part 16: Combined bounce or steady-state acceleration and dry heat or cold' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Optical and Mathematical Instruments Sectional Committee and approval of the Mechanical Engineering Division Council.

This is one in the series of standards relating to testing of optics and optical instruments. This standard was prepared to test the ability of optical instruments and instruments containing optical components under equivalent conditions to resist and to the extent the performance characteristics are affected by combined bounce or steady-state acceleration and dry heat or cold.

There is another series of Indian Standards on Procedure for basic climatic and durability test for optical instruments IS 10236 (Parts 1 to 18).

The text of ISO Standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 9022-1:1994	IS 10236 (Part1):1989 Procedure for basic climatic and durability tests for optical instruments: Part 1 General	Technically equivalent
ISO 9022-2:1994	IS 10236 (Parts 2 to 5) : 1982 Procedure for basic climatic and durability tests for optical instruments: Part 2 Dry heat test Part 3 Cold test Part 4 Damp heat test Part 5 Damp heat (cyclic) test	do

The concerned technical committee has reviewed the provisions of ISO 9022-3:1998 and IEC 60068-2-47 : 1982 referred in this standard and has decided that they are acceptable for use in conjunction with this standard.

Indian Standard

OPTICS AND OPTICAL INSTRUMENTS — ENVIRONMENTAL TEST METHODS — COMBINED BOUNCE OR STEADY-STATE ACCELERATION AND DRY HEAT OR COLD

1 Scope

This part of ISO 9022 specifies methods for the testing of optical instruments and instruments containing optical components, under equivalent conditions, for their ability to resist combined bounce or steady-state acceleration and dry heat or cold.

The purpose of the testing is to investigate to what extent the optical, thermal, mechanical, chemical and electrical performance characteristics of the specimen are affected by combined bounce or steady-state acceleration and dry heat or cold.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9022. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9022 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 9022-1:1994, *Optics and optical instruments — Environmental test methods — Part 1: Definitions, extent of testing.*

ISO 9022-2:1994, *Optics and optical instruments — Environmental test methods — Part 2: Cold, heat, humidity.*

ISO 9022-3:1998, *Optics and optical instruments — Environmental test methods — Part 3: Mechanical stress.*

IEC 60068-2-47:1982, *Environmental testing — Part 2: Tests — Mounting of components, equipment and other articles for dynamic tests including shock (Ea), bump (Eb), vibration (Fc and Fd) and steady-state acceleration (Ga) and guidance.*

3 General information and test conditions

Exposure of the specimen to combined stress conditions renders the test much more severe than seperate exposure to any one of the environmental conditions cited.

The values of temperature specified in the tables are selected from ISO 9022-2, conditioning methods 10 and 11.

The test shall be conducted in accordance with the requirements of ISO 9022-3.

The fixture for the specimen shall meet the requirements of IEC 60068-2-47 and shall be thermally insulated, if appropriate.

If the specimen is mounted on shock absorbers, time shall be allowed for temperature stabilization of the absorber elements.

The test for bounce resistance (conditioning methods 57 and 58) shall be performed on instruments in their transport packing, or in their storage or carrying case.

4 Conditioning

4.1 General

The required exposure time shall not commence until all parts of the specimen have reached a temperature within at least 3 K of the test chamber temperature. For heat-dissipating specimens, the period of exposure shall not begin until the temperature of the specimens changes not more than 1 K within one hour at the stabilized test chamber temperature. The last hour of the temperature-soaking time shall be considered to be the first hour of the exposure period.

4.2 Conditioning method 57: Combined bounce, dry heat

See table 1.

Table 1 — Degrees of severity for conditioning method 57: Combined bounce, dry heat

Degree of severity			01	02	03	04	05	06	07	08	09	10	11	12
Test chamber temperature		°C	63 ± 2			85 ± 2			40 ± 2			55 ± 2		
Relative humidity		%	< 40											
Exposure time	min		15	60	180	15	60	180	15	60	180	15	60	180
	Acceptable deviation		± 10 %											
State of operation			0											
NOTE The period of exposure shall be allocated in equal portions to each of the surfaces to be exposed.														

4.3 Conditioning method 58: Combined bounce, cold

See table 2.

Table 2 — Degrees of severity for conditioning method 58: Combined bounce, cold

Degree of severity		01	02	03	04	05	06	07	08	09	10	11	12
Test chamber temperature	°C	− 25 ± 3			− 35 ± 3			− 55 ± 3			− 65 ± 3		
Exposure time	min	15	60	180	15	60	180	15	60	180	15	60	180
	Acceptable deviation	± 10 %											
State of operation		0											
NOTE The period of exposure shall be allocated in equal portions to each of the surfaces to be exposed.													

4.4 Conditioning method 59: Combined steady state acceleration, dry heat

See table 3.

Table 3 — Degrees of severity for conditioning method 59: Combined steady-state acceleration, dry heat

Degree of severity		01	02	03	04	05	06	07	08	09
Test chamber temperature	°C	40 ± 2			55 ± 2			63 ± 2		
Relative humidity	%	< 40								
Acceleration	m/s^2	50	100	200	50	100	200	50	100	200
	g_n multiples	5	10	20	5	10	20	5	10	20
Exposure time along each axis and each direction	s	> 10*)								
State of operation		0 or 1 or 2								
*) The exposure time begins after reaching the rated number of revolutions.										

4.5 Conditioning method 60: Combined steady state acceleration, cold

See table 4.

Table 4 — Degrees of severity for conditioning method 60: Combined steady-state acceleration, cold

Degree of severity		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
Test chamber temperature	°C	− 10 ± 3			− 20 ± 3			− 25 ± 3			− 35 ± 3			− 55 ± 3			− 65 ± 3		
Acceleration	m/s^2	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
	g_n multiples	5	10	20	5	10	20	5	10	20	5	10	20	5	10	20	5	10	20
Exposure time along each axis and each direction	s	> 10*)																	
State of operation		0 or 1 or 2																	
*) The exposure time begins after reaching the rated number of revolutions.																			

5 Procedure

5.1 General

The tests shall be conducted in accordance with the requirements of the relevant specification and of the reference documents.

5.2 Test sequence

The time of exposure to test temperatures depends upon the thermal behaviour of the specimen and on the specified time of exposure to bounce or steady-state acceleration.

The specimen may be repositioned, for bounce or steady-state acceleration, along another axis, at any temperature between ambient and test temperature, provided that there is no formation of condensate, hoarfrost or ice.

5.3 Temperature soaking of specimen in conditioning methods 57 and 58

For conditioning the specimen, the bounce testing machine should preferably be mounted inside a cold or heat chamber. If conditioning is performed outside the chamber, care should be taken to ensure that the temperature of the specimen remains within permitted limits during the conditioning.

5.4 Temperature soaking of specimen in conditioning methods 59 and 60

Installation of the centrifuge for the uniform acceleration of the specimen inside a cold or heat chamber is not necessary, especially in view of the short exposure time. Care should however be taken to ensure that the temperature of the specimen remains within permitted limits during the conditioning.

Suitable ways of ensuring this are, for example, heating the fixture for the specimen device to a temperature exceeding that of the specimen and the use of temperature-regulated or preconditioned insulating domes. It may be specified in the relevant specification that the time pattern followed by the temperature change in the thermally insulated specimen — outside the chamber — is to be determined. This establishes the time available for mounting and conditioning within which the temperature change occurring in the specimen remains within permitted limits.

6 Environmental test code

The environmental test code shall be as defined in ISO 9022-1, giving a reference to ISO 9022 and the codes for the conditioning method chosen, the degree of severity and the state of operation.

EXAMPLE

The environmental test of optical instruments for resistance to combined bounce, dry heat, conditioning method 57, degree of severity 03, state of operation 0, is identified as:

Environmental test ISO 9022-57-03-0

7 Specification

The relevant specification shall contain the following details:

a) environmental test code;

b) number of specimens;

c) conditioning methods 57 and 58: type and scope of packing and surfaces to be exposed;

d) conditioning methods 59 and 60: axes along which, and direction in which, specimens shall be exposed;

e) location and number of temperature measuring points;

f) if required: determination of time pattern followed by the temperature change according to 5.4;

g) preconditioning;

h) type and scope of initial test;

i) state of operation 2: period of operation;

j) state of operation 2: type and scope of intermediate test;

k) recovery;

l) type and scope of final test;

m) criteria for evaluation;

n) type and scope of test report.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of stardardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publication), BIS

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. ME 31 (0596).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 323 01 31, 323 3375, 323 94 02

Telegrams: Manaksanstha
(Common to all offices)

Regional Offices:		Telephone
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	323 76 17, 323 38 41
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi CALCUTTA 700054	337 84 99, 337 85 61 337 86 26, 337 91 20
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43 60 20 25
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	235 02 16, 235 04 42 235 15 19, 235 23 15
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	832 92 95, 832 78 58 832 78 91, 832 78 92
Branches	: AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM.	

Printed at Simco Printing Press, Delhi